US 20160286507A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2016/0286507 A1

(43) Pub. Date: Sep. 29, 2016

Yang et al.

(54) **SYNCHRONIZATION SIGNAL DESIGN FOR DEVICE TO DEVICE OPERATION**

(71) Applicant: **NOKIA SOLUTIONS AND NETWORKS OY**, Espoo (FI)

(72) Inventors: **Weidong Yang**, San Diego, CA (US); **Zexian Li**, Espoo (FI); **Lars Lindh**, Helsingfors (FI)

(73) Assignee: **Nokia Solutions and Networks Oy**, Espoo (FI)

(21) Appl. No.: **15/033,962**

(22) PCT Filed: **Nov. 7, 2014**

(86) PCT No.: **PCT/EP2014/074095**

§ 371 (c)(1),
(2) Date: **May 3, 2016**

Related U.S. Application Data

(60) Provisional application No. 61/901,694, filed on Nov. 8, 2013.

Publication Classification

(51) **Int. Cl.**

H04W 56/00	(2006.01)
H04W 76/02	(2006.01)
H04W 8/00	(2006.01)

(52) **U.S. Cl.**

CPC ***H04W 56/002*** (2013.01); ***H04W 8/005*** (2013.01); ***H04W 76/023*** (2013.01)

(57) **ABSTRACT**

Various communication systems may benefit from appropriate synchronization signal design. For example, third generation partnership project (3GPP) long term evolution advanced (LTE-A) releases 12 and 13 (Rel 12/13) may benefit from such design for device to device (D2D) communications. In particular, synchronization signals may be designed to benefit proximity services (ProSe)/D2D discovery and communication. A method can include transmitting a cellular synchronization signal on a first resource. The method can also include transmitting a device to device synchronization signal on a second resource. The first resource can be different from the second resource. The cellular synchronization signal and the device to device synchronization signal can share a same base sequence.